Effect of the Adapted NASA Mission X international child fitness program on young children and their parents in South Korea

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INTRODUCTION

- Obesity has become a global epidemic. Childhood obesity is global public health concern including in South Korea where 16.2% of boys and 9.9% of girls are overweight or obese in 2011.
- Effective and sustainable intervention programs are needed for prevention of childhood obesity.
- Obesity prevention programs for young children may have a greater intervention effect than in older children.
- The NASA Mission X: Train Like an Astronaut (MX) program was developed to promote children's exercise and healthy eating by tapping into their excitement for training like an astronaut.
- This study aimed to examine the feasibility and effectiveness of the adapted NASA MX intervention in promoting PA in young children and in improving parents' related perspectives.

METHODS AND MATERIALS

- Total 212 healthy 5-year-old children were enrolled through three specified kindergartens in the cities of Seoul, O-san, and Yong-in.
- An age-appropriate curriculum and a teacher guidebook were developed in Korean after adapting MX program.
- This 6- week curriculum covered physical activity (PA) and nutrition education and conducted by eight lead teachers of Kindergarten during fall 2014.
- Parents responded to the pre- and post- survey questionnaires (n=154).

Table 1. Intervention modules of 6-week curriculum

wk	Theme	Activity	Goals
1	Do a space walk!	Bear crawl, crab walk	Muscle strength, coordination
2	Jump for the moon	Jump training with a rope	Bone strength, muscle Endurance
3	Agility Astro-course	Running a specific course	Agility, coordination, speed
4	Energy of an astronaut	Categorizing different food items	Understanding specific nutritional needs
5	Reduced gravity, Low-fat	Discovering fat contents	Formulating balanced meal
6	Building an astronaut core	Commander crunch, pilot plank	Abdominal and back muscle strength

- Child weight status was classified using BMI percentiles from the Korean CDC growth chart (Overweight≥ 85%tile and underweight<10%tile; KCDC, 2007).
- Godin Leisure-time Exercise Questionnaire (Godin G, et al., 1997) and psychological need satisfaction after exercise (Wilson PM et al, 2006) were used to test children's change after this intervention program.

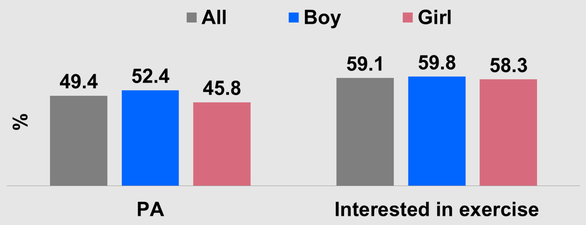
RESULTS

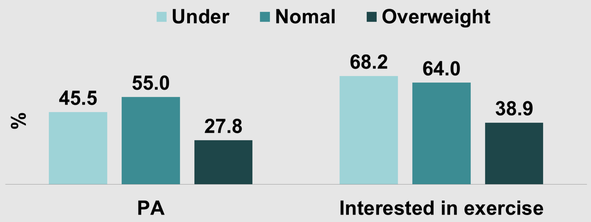
Table 1. Baseline characteristics of participating Korean children (n=212) from 3 kindergartens

	Boys	Girls	p
Sample size	106	97	
Height (cm)	119.4 (4.8)	116.2 (4.6)	<0.01
Weight (kg)	22.7 (3.3)	20.7 (2.9)	<0.01
BMI (kg/m^1)	15.7 (1.8)	15.3 (1.7)	0.103
BMI status (%)			
• **Underweight (<10th %tile)**	18.8	18.0	0.977
• **Normal weight (10- 84th %tile)**	68.0	69.7	
• **Overweight (≥85th %tile)**	13.3	12.3	
Leisure time activity at home (score)$^{2)}$	59.0 (23.6)	40.7 (24.5)	<.001
Physical activity levels (%)			
• **Active**	82.1	56.7	<.001
• **Insufficiently active**	17.9	43.3	

Intervention effects: I. Child's PA level and interest in exercise

Figure 1. Intervention effects: Percentage of positive changes in child physical activity level and interest in exercise by child sex and weight status (n=154)

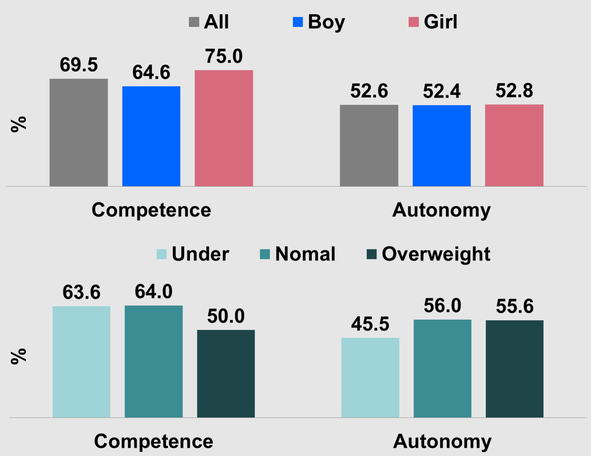




All pre and post differences by paired t-test and Wilcoxon signed rank test were significant (p< 0.05). All X^2 tests for differences by sex and weight status were insignificant.

2. Child 's psychological need satisfaction in exercise

Figure 2. Percentage of positive changes in child's need satisfaction in exercise by child sex and weight status (n=154)



All pre and post differences by paired t-test and Wilcoxon signed rank test were significant (p< 0.05). All X^2 tests for differences by sex and weight status were insignificant.

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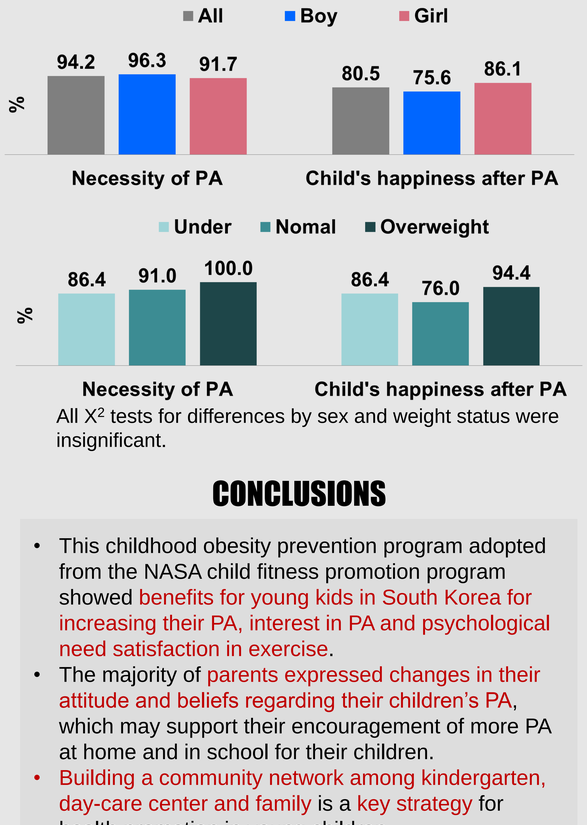
3. Parental attitude and beliefs on their child's PA

Figure 3. Percentage of positive changes in parental attitude and beliefs on child's PA (n=154)



All X^2 tests for differences by sex and weight status were insignificant.

CONCLUSIONS

- This childhood obesity prevention program adopted from the NASA child fitness promotion program showed benefits for young kids in South Korea for increasing their PA, interest in PA and psychological need satisfaction in exercise.
- The majority of parents expressed changes in their attitude and beliefs regarding their children's PA, which may support their encouragement of more PA at home and in school for their children.
- Building a community network among kindergarten, day-care center and family is a key strategy for health promotion in young children.
- Further research needs to test its long-term effects on child BMI and other health outcomes.

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